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Novel Animal Model of Obsessive-Compulsive Disorder

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Abstract

During the last 30 years there have been many attempts to develop animal models of obsessive compulsive disorder. In the past 5 years, however, there is a change in the field with most papers aiming to study the pharmacology and neural basis of compulsive behaviors using a few established animal models of OCD, and only a few papers presenting new animal models. In 2012 we had develop the active animal models of OCD and here we focusing the information about new animal models of OCD (Indian Patent No. 3087/DEL/2012).

Flickering Light Induced Obsessive-Compulsive Behaviour Model

Principle

It was observed that when mice were exposed to flickering light continuously for a period of 1 hour they produced repetitive gnawing behavior [1-3]. This behavior was correlated with compulsive action of patients suffering from Obsessive-compulsive disorder. It is possible that mice experienced abnormal situation, when they were exposed to mild aversive environment such as flickering light in the present model leading to continuous biting of objects present in their surroundings. We provided small pieces of thermocol, which were wrapped with glazed paper as novel objects.

End Point

All the thermocol pieces were removed from the unique chamber of the model & the number of these thermocol pieces, which were gnawed by the mouse were counted and compared with the control group at the end of the experiment. It was observed that mice, when exposed to flickering light individually showed repetitive gnawing behavior as reflected by biting of thermocol pieces. The mirrors attached to the four walls of chamber helped in producing a unique novel environment & enhanced the flickering effect of the bulbs.

Procedure

A mouse was kept in the unique chamber consisting of mirror on its four walls & flickering bulbs (15 watt) at the ceiling of the chamber. The dimensions of this unique plywood box were 36 cm×30 cm×45 cm [3-5]. The thermocol pieces (4 cm^3×3 cm^3×1 cm^3) wrapped with glazed paper were placed at the floor of the chamber uniformly. Then this mouse was exposed to flickering light for a period of 60 min. produced by four bulbs (15 watt) each fixed at the ceiling of the chamber to which animals had no access. All the thermocol pieces were removed from the unique chamber at the end of the experiment & total number of gnawed pieces of thermocol were counted. It was observed that there was a significant increase in the number of gnawed pieces of thermocol, when mouse was exposed to flickering light in the unique chamber from where there was no escape. This repetitive gnawing behavior of mice was successfully reversed by established anti-OCD medicines such as fluoxetine, venlafaxine, haloperidol & lorazepam. Furthermore, these animals behaved like normal mice after four days of the experiment.

The validity of the flickering light induced obsessive-compulsive behaviour model was studied using different categories of psychoactive agents such as fluoxetine, venlafaxine, haloperidol & lorazepam. The findings were highly promising and confirmed the usefulness of the newly developed laboratory model.

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